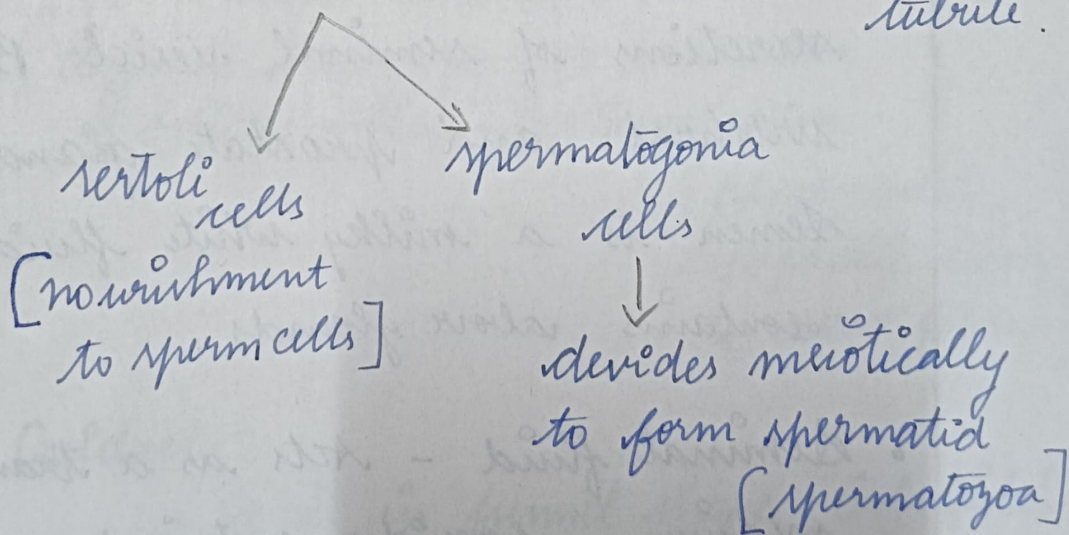


2. Human Reproduction.

Male reproductive system:

- Testis : primary sex organ.
- Oval body inside the scrotum.
- Scrotum - Thermoregulator.
- Testis is covered by Tunica Albuginea.
- 200 - 250 lobules.
- 2 - 4 highly coiled seminiferous tubule.
- Stratified epithelium of seminiferous tubule.



Accessory ducts:

Rete testis → Vasa efferentia →

Epididymis → sperm duct (Vas deferens)

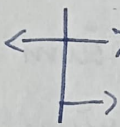
Accessory glands:

- seminal vesicle - produces seminal plasma [fructose sugar, prostaglandins, ascorbic acid, vesicular enzyme]
- Bulbo urethral gland:
secretion helps in lubrication of penis.
- prostate gland: -
Below the urinary bladder.
- Semen - It is the sperm and the secretions of seminal vesicle Bulbo urethral and prostate gland.
Semen is a milky white fluid that contains above glands.
- Seminal fluid - Acts as a transport medium, provides nutrients, contains chemicals that protect and activate the sperm.

Female Reproductive System:

- Pair of ovary - Primary sex organ.
- Pair of oviduct
- Uterus
- Cervix
- Vagina
- Vulva

Ovaries:

- It produces ovum.
 - It is in elliptical structure.
 - It is 2-4 cm long.
 - Encloses ovarian stroma.
- [different stages of follicle cells]  outer cortex
inner cortex

[Blood Vessels,
lymphatic Vessels
& nerve fibres]

Oviduct:

- It is in funnel shape - Infundibulum
- Finger like projection
↳ Fimbriae
- Wider portion - ampulla
- The infundibulum connects the uterus - Isthmus.

Uterus :

- It is located in pelvic cavity
- Below the rectum and urinary bladder
- 3 inch long & 2 inch wide
- The Uterus extends upto 20 inches during pregnancy.
- It is highly vascular, inverted pear shape.

Cervix - The neck of the uterus :

- Wall of the uterus has three layers.
 - => perimetrium
 - => myometrium
 - => endometrium

Vagina :

- It extends from cervix to the exterior
- Compulsator organ
- Vulva - external genitalia
 - [labia Majora,
 - labia Minora

Accessory gland:

- Bartholin's gland - posterior to the left + right side of Vagina.
- secretes mucus to lubricate Vagina
- It is equivalent to bulbourethral gland.

Skene's gland - Anterior wall of vagina

- secretes lubricating fluid.
- similar to prostate gland.

Spermatogenesis:

- Multiplication factor:

At puberty primordial germ cell mitotically divide to produce spermatogonia (sperm mother cell) $(2n)$

- Growth phase:

Spermatogonia stops dividing and start growing - primary spermatocytes (It gets nourishment from the Sertoli cells)

• Maturation phase:

primary spermatocyte ($2n$)
↓
1st meiotic division

Two secondary spermatocyte (n)

↓
2nd meiotic division
Spermatids (n)

Structure of spermatozoa:

- Human sperm is motile - flagellated and microscopic.
- It consist of head, middle piece, tail.

⇒ Head - It contains nucleus and Acrosome - formed by Golgi bodies.

- Acrosome contains a proteolytic enzymes. [Hyaluronidase]

- Nucleus is flat and oval.

- Neck is very short between head and middle piece.

- Neck contains proximal and distal centriole.

- Distal centriole gives rise to anial filament.

=> Middle piece - It contains Mitochondria - twisted along anial filament called Nebenger.

=> Tail - is the longest part of the sperm. - formed of central anial filament.

- It is used for motility.

Oogenesis:

germinal epithelium



mitotic
division

oogonia ($2n$) (ovum mother cell)



Ist meiosis

primary oocyte (n)

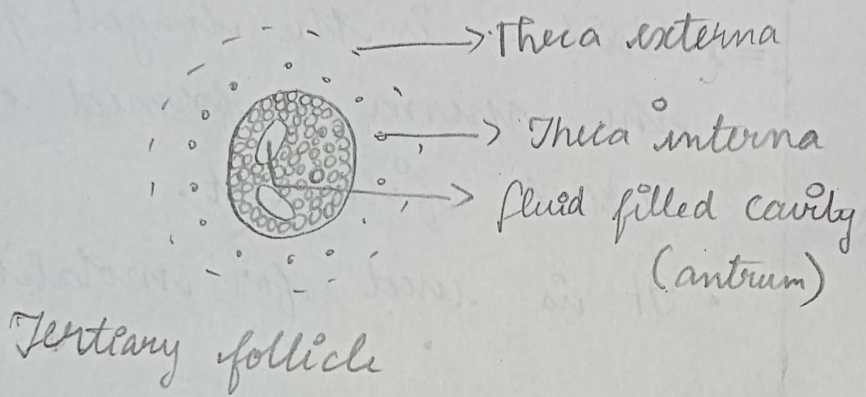
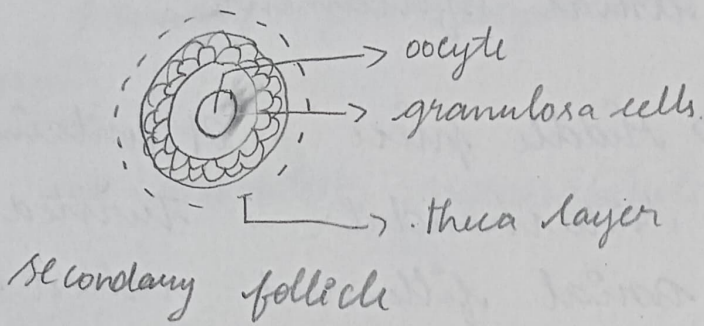
Primary follicle:

- Primary oocyte gets surrounded by granulosa cells. [many layers] and theca layers.



single granulosa
cells

- primary follicle \rightarrow secondary follicle



- During puberty the primary oocyte within the tertiary follicle grows in size and completes the I^{st} meiotic division and form secondary oocyte and a I^{st} polar body.
- During fertilization the secondary oocyte undergoes II^{nd} meiotic division and produce ovum and II^{nd} polar body.

Menstrual cycle:

- Menstrual phase
- Follicular phase
- Ovulatory phase
- luteal phase

Fertilization and Implantation:

- The fusion of male & female gamete to form zygote.
- When sperm enters into the female reproductive tract it undergoes capacitation.
- Capacitation is a bio-chemical event that enables the sperm to penetrate and fertilized the ovum.
- Fertilization takes place in ampulla.
- The sperm penetrates the layers of ovum.

- zygote undergoes first cleavage

(1) 2 cell stage - Blastomere

(2) After 72 hrs - Berry shaped cluster of cells (16 cell stage) morula

(3) within 4 to 5 days, 100 cell stage is Blastocyst, which reaches the uterus and gets implanted in the endometrium.

- Blastocyst consist of single layer large flattened cells - Trophoblast and cluster of 20 to 30 rounded cell (inner cell mass)

- The inner cell mass develops into embryo.

- It gets embedded in the uterus [Implantation]

Ectopic Pregnancy:

- If fertilized ovum gets implanted outside the uterus [mostly in the fallopian tube]

Extra Embryonic Membranes :

- Amnion
- Yolk Sac
- Allantois
- Chorion

Hormones during pregnancy :

hcg - Human chorionic gonadotropin

hcs - Human chorionic

somatotrophin

Relaxin - Later stage of pregnancy.
relaxation of pelvic
during parturition. ligament.

Parturition and Lactation :

Labour. - [during parturition] The series of events that expels the infant from the uterus.

Oestrogen: → leads to uterine contraction



downward movement
of foetus



descent of foetus

↓
dilation of cervix

↓
Neurohumoral reflex /
Ferguson reflex /
Foetal ejection reflex.

Oxytocin :

• Brings strong contraction of uterus → leads to expulsion of baby.

Relaxin: powerful contraction of uterus & relaxation of pelvic ligament.

Lactation :

- The production of milk from the mammary gland.
- Increased secretion of oestrogen, Progesterone and hpl (human placental lactogen).

↓
stimulates hypothalamus.

↓
It stimulates anterior pituitary to produce prolactin.

prolactin (milk formation)

↓ lactogenesis

Oxytocin: - let-down reflex
(ejection of milk)

Colostrum: It is the nutrient rich milk produce immediately after child birth.